



#### Features

- High isolation 3750 V<sub>RMS</sub>
- Patented coplanar structure **DMC**®
- Various CTR selection available
- DC input with transistor output
- Operating temperature range - 55 °C to 125 °C
- RoHS and REACH compliance
- Halogen Free compliance
- Regulatory Approvals
  - ✓ UL - UL1577 (pending approval)
  - ✓ VDE - EN60747-5-5 (VDE0884-5)
  - ✓ CQC - GB4943.1, GB8898

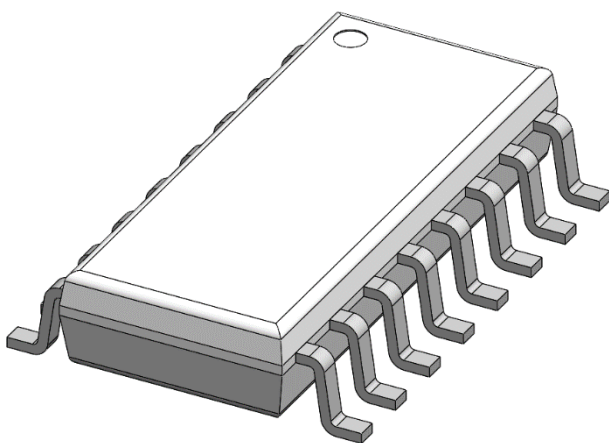
#### Description

The CTH291-4 series have four isolated channels, each channel contains a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 16-lead **DMC**® half pitch Mini-Flat package.

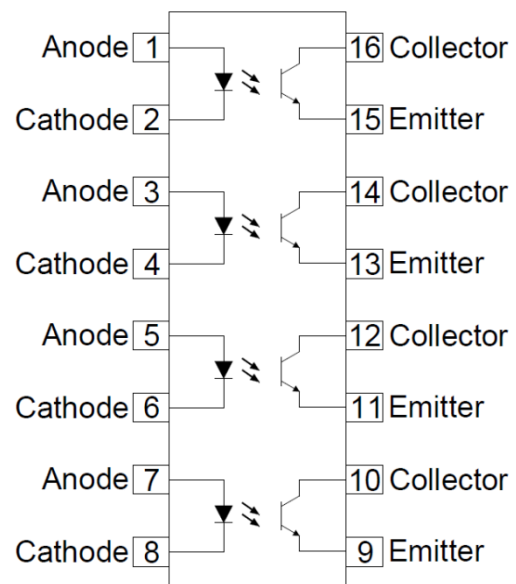
#### Applications

- DC-DC Converters
- Programmable controllers
- Telecommunication equipment
- Hybrid substrates that require high density mounting

#### Package Outline



#### Schematic





# CTH291-4 Series

## DC Input 16-Pin DMC<sup>®</sup> Half Pitch Mini-Flat

### Phototransistor Optocoupler

#### Absolute Maximum Rating at 25°C

Symbol	Parameters	Ratings	Units	Notes
V <sub>ISO</sub>	Isolation voltage	3750	V <sub>RMS</sub>	1
T <sub>OPR</sub>	Operating temperature	-55 ~ +125	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +150	°C	
T <sub>SOL</sub>	Soldering temperature	260	°C	2
P <sub>TOT</sub>	Total power dissipation	200	mW	
<b>Emitter</b>				
I <sub>F</sub>	Forward current	50	mA	3
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W,300pps)	1	A	3
V <sub>R</sub>	Reverse voltage	6	V	3
P <sub>D</sub>	Power dissipation	70	mW	3
<b>Detector</b>				
P <sub>C</sub>	Power dissipation	100	mW	3
B <sub>VCEO</sub>	Collector-Emitter Breakdown Voltage	80	V	3
B <sub>VECO</sub>	Emitter-Collector Breakdown Voltage	7	V	3
I <sub>C</sub>	Collector Current	50	mA	3

#### Notes

1. AC for 1 minute, RH = 40 ~ 60%.
2. For reflow process
3. Each Channel



**Electrical Characteristics** *T<sub>A</sub> = 25°C, Each Channel (unless otherwise specified)*

**Emitter Characteristics**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V <sub>F</sub>	Forward voltage	I <sub>F</sub> =10mA		1.24	1.4	V	
I <sub>R</sub>	Reverse Current	V <sub>R</sub> = 6V	-	-	5	μA	
C <sub>IN</sub>	Input Capacitance	f= 1MHz	-	10	30	pF	

**Detector Characteristics**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
B <sub>VCEO</sub>	Collector-Emitter Breakdown	I <sub>C</sub> = 0.1mA	80	-	-	V	
B <sub>VECO</sub>	Emitter-Collector Breakdown	I <sub>E</sub> = 0.1mA	7	-	-	V	
I <sub>CEO</sub>	Collector-Emitter Dark Current	V <sub>CE</sub> = 20V, I <sub>F</sub> =0mA	-	-	100	nA	

**Transfer Characteristics**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes	
CTR	Current Transfer Ratio	I <sub>F</sub> = 5mA, V <sub>CE</sub> = 5V	CTH291-4	50		400	%	
			CTH291-4GB	100		400		
V <sub>CE(SAT)</sub>	Collector-Emitter Saturation Voltage	I <sub>F</sub> = 20mA, I <sub>C</sub> = 1mA	-	0.1	0.2	V		
R <sub>IO</sub>	Isolation Resistance	V <sub>IO</sub> = 500V <sub>DC</sub>	5x10 <sup>10</sup>			Ω		
C <sub>IO</sub>	Isolation Capacitance	f= 1MHz		0.5	1	pF		

**Switching Characteristics**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
t <sub>r</sub>	Rise Time	I <sub>C</sub> = 2mA, V <sub>CE</sub> = 2V, R <sub>L</sub> = 100Ω	-	6	18	μs	
t <sub>f</sub>	Fall Time		-	8	18		



# CTH291-4 Series DC Input 16-Pin DMC<sup>®</sup> Half Pitch Mini-Flat Phototransistor Optocoupler

## Test Circuit

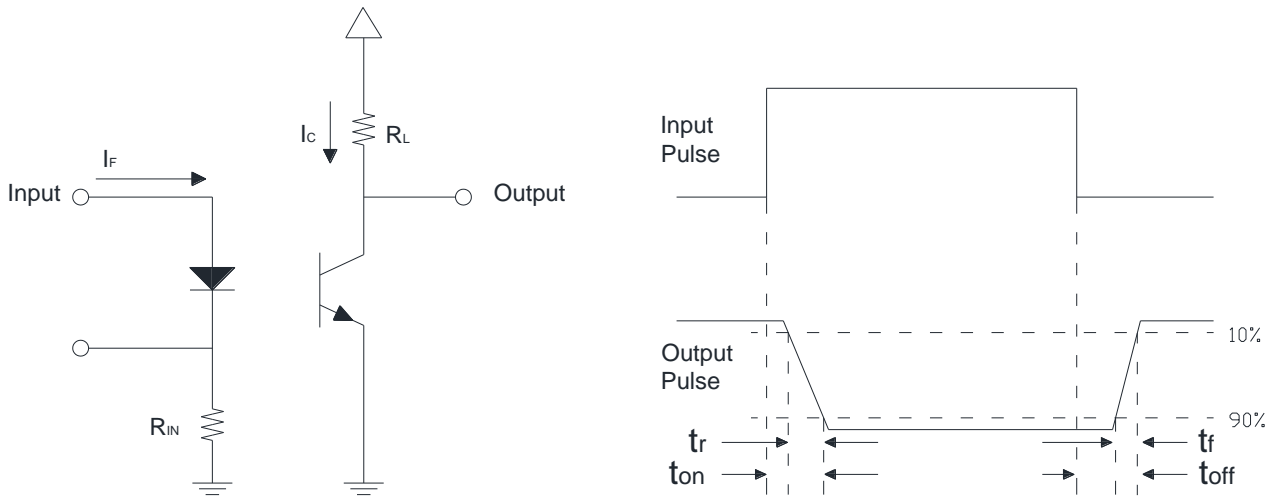


Figure 11: Switching Time Test Circuits

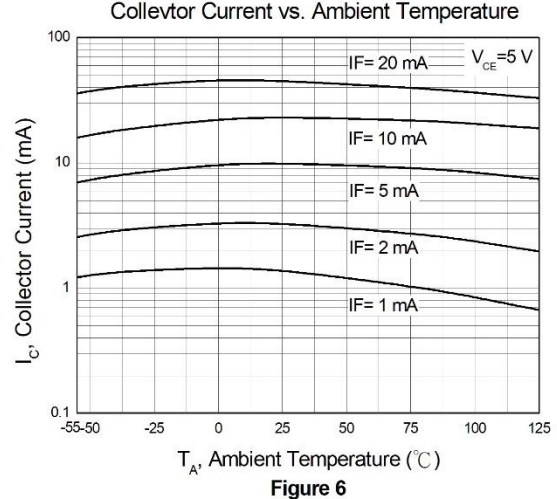
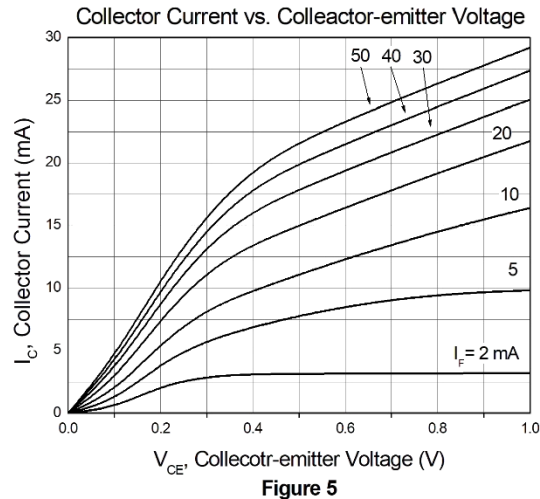
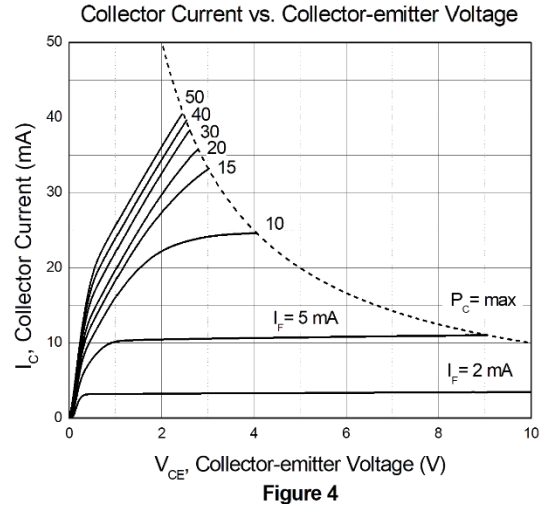
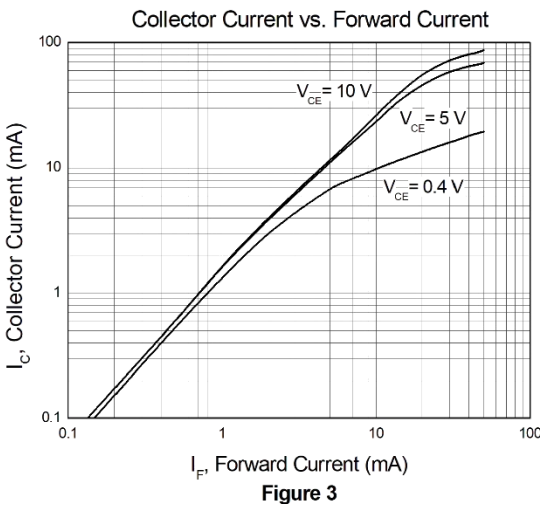
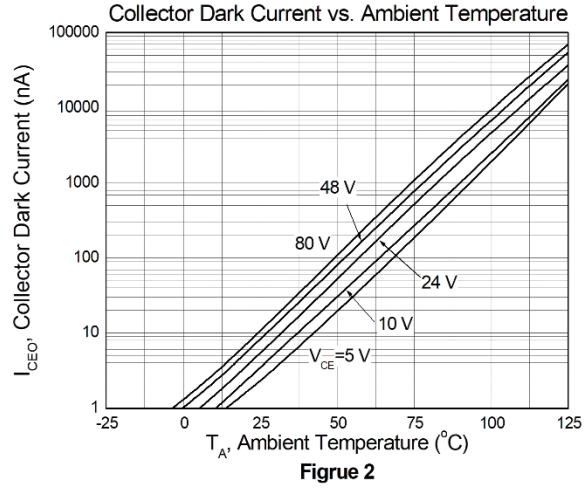
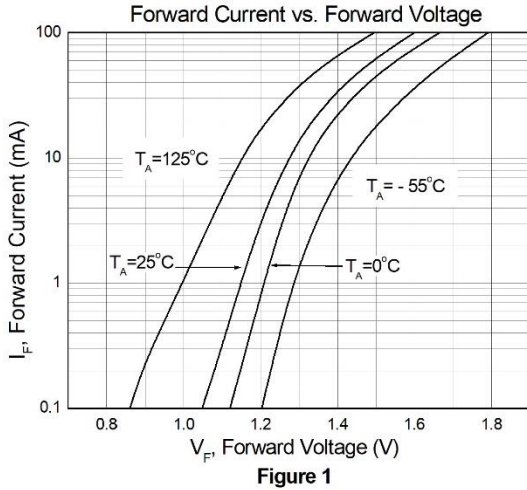


# CTH291-4 Series

## DC Input 16-Pin DMC<sup>®</sup> Half Pitch Mini-Flat

### Phototransistor Optocoupler

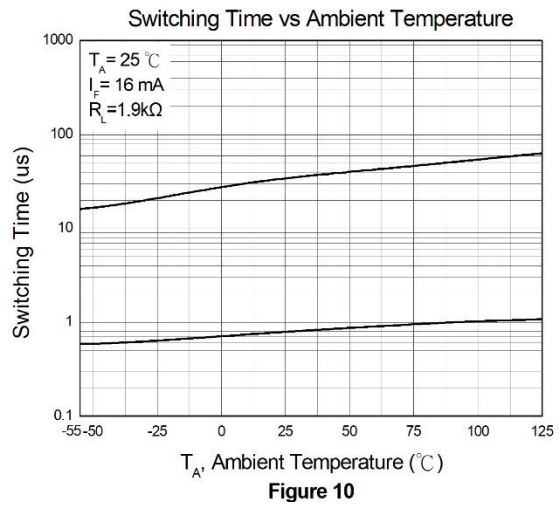
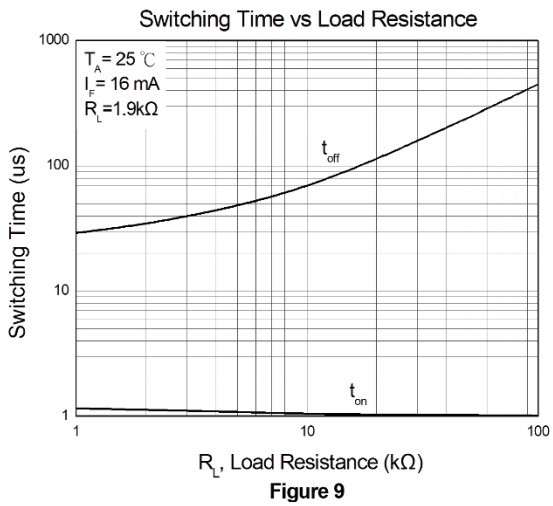
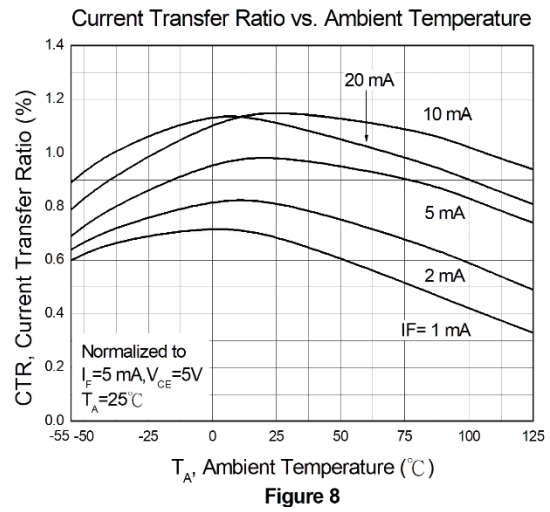
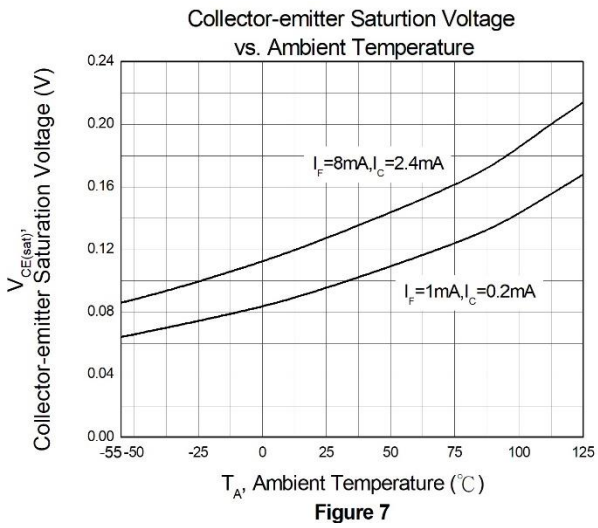
### Typical Characteristic Curves





# CTH291-4 Series

## DC Input 16-Pin DMC<sup>®</sup> Half Pitch Mini-Flat Phototransistor Optocoupler



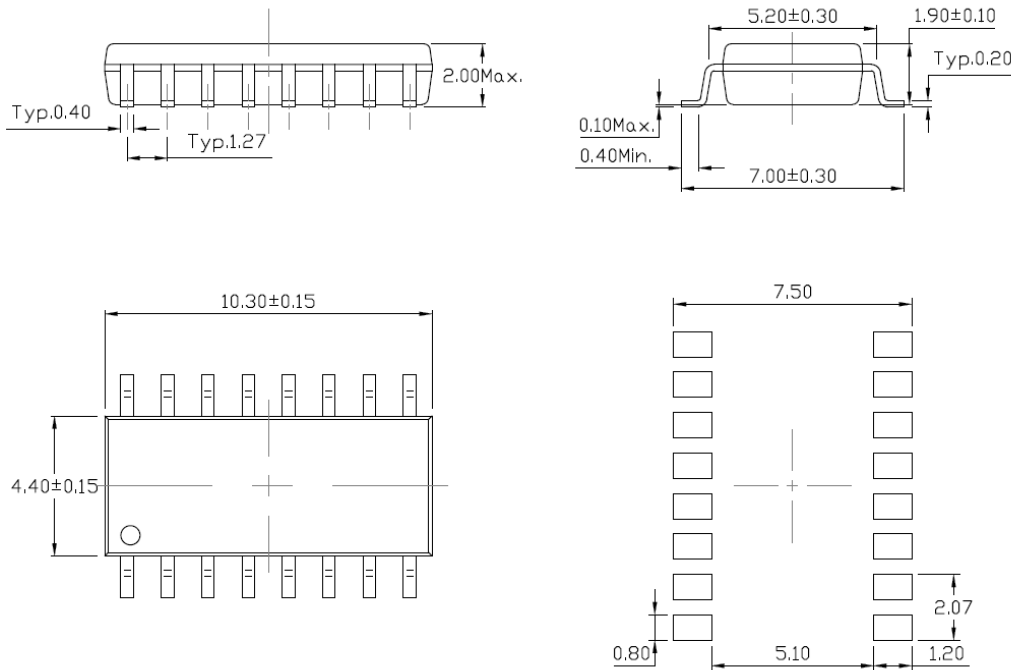


# CTH291-4 Series

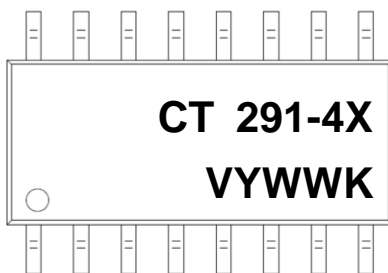
## DC Input 16-Pin DMC<sup>®</sup> Half Pitch Mini-Flat

### Phototransistor Optocoupler

#### Package Dimension *Dimensions in mm unless otherwise stated*



#### Marking Information



#### Note:

- CT : Denotes "CT Micro"
- 291-4 : Product Number
- X : CTR Rank
- V : VDE Safety Mark
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code



# CTH291-4 Series

## DC Input 16-Pin DMC<sup>®</sup> Half Pitch Mini-Flat

### Phototransistor Optocoupler

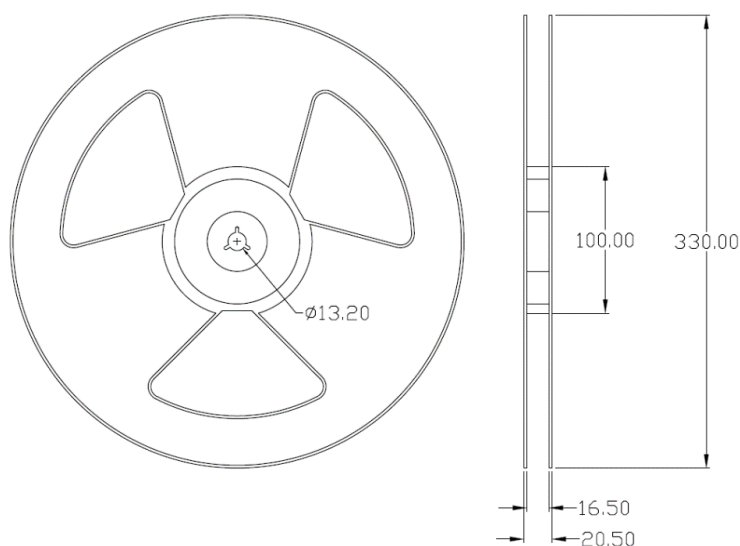
#### Ordering Information

#### CTH291-4X (V)(Z)

- CT = Denotes “CT Micro”
- H291-4 = Product Number
- X = CTR Rank Option (Blank or GB)
- V = VDE Safety Mark Option (Blank or V)
- Z = Tape and reel Option (T1 or T2)

Option	Description	Quantity
T1	Surface Mount Lead Forming – With Option 1 Taping	2000 Units/Reel
T2	Surface Mount Lead Forming – With Option 1 Taping	2000 Units/Reel

#### Reel Dimension *All dimensions are in mm, unless otherwise stated*







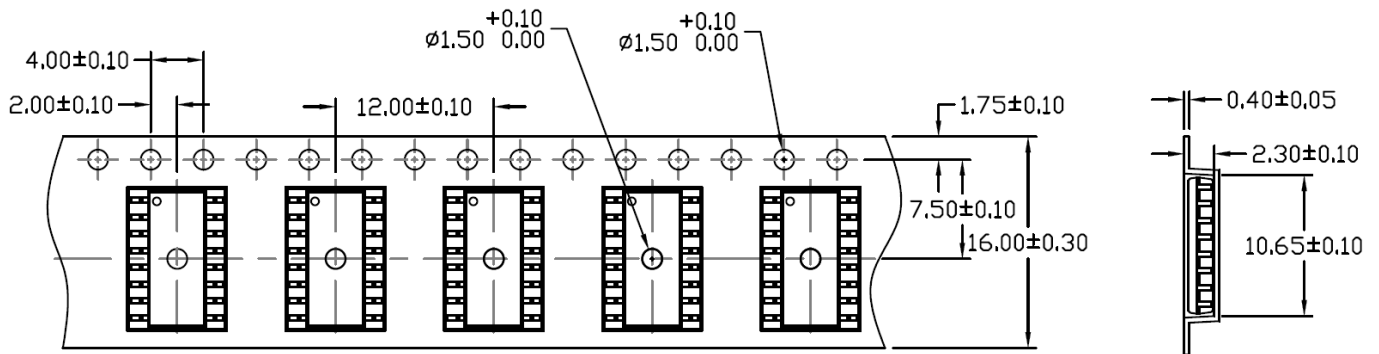
# CTH291-4 Series

## DC Input 16-Pin DMC<sup>®</sup> Half Pitch Mini-Flat

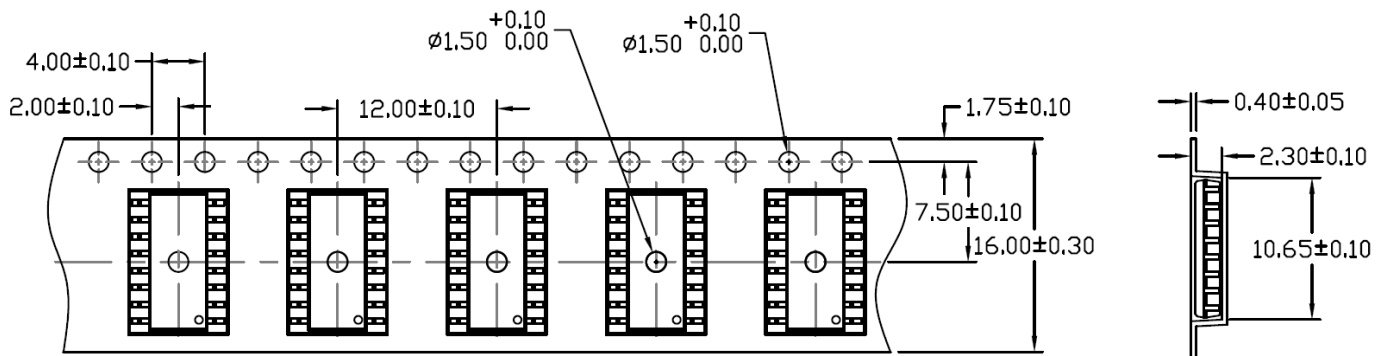
### Phototransistor Optocoupler

#### Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

##### Option T1



##### Option T2





### Solderability spec (Follow the JEDEC standard JESD22-B102)

Reflow Soldering: Immersed surface, other than the end of pin as cut-surface, must be covered by solder.

Solder-Bath: More than 95% of the electrode must be covered with solder.

### Wave soldering (Follow the JEDEC standard JESD22-A111)

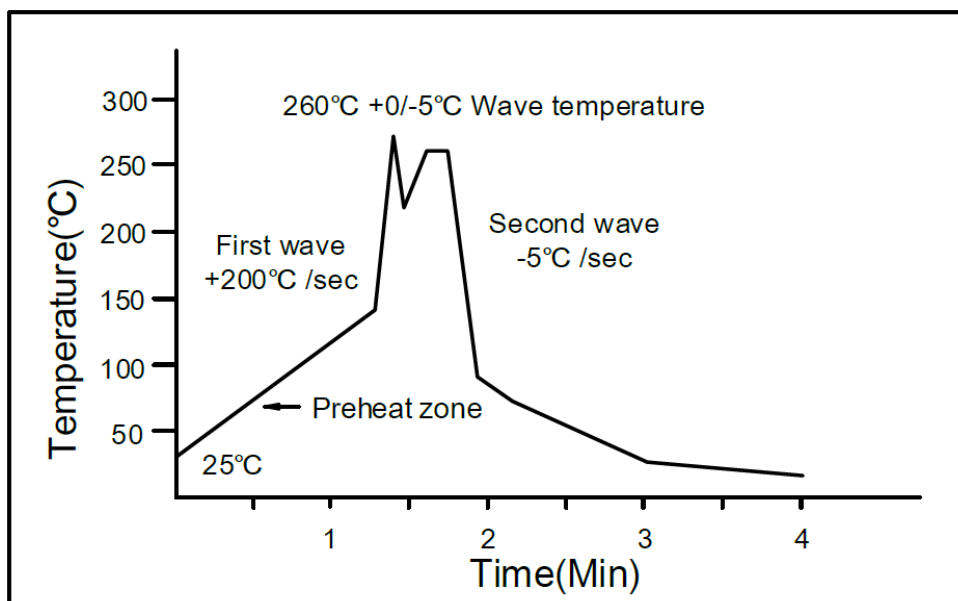
One time soldering is recommended within the condition of temperature.

Temperature:  $260 \pm 0/-5^{\circ}\text{C}$ .

Time: 10 sec.

Preheat temperature: 25 to  $140^{\circ}\text{C}$ .

Preheat time: 30 to 80 sec.



### Hand soldering by soldering iron

(Follow the standard MIL-STD 202G, Method 210F)

Allow single lead soldering in every single process.

One time soldering is recommended. Temperature:  $350 \pm 10^{\circ}\text{C}$

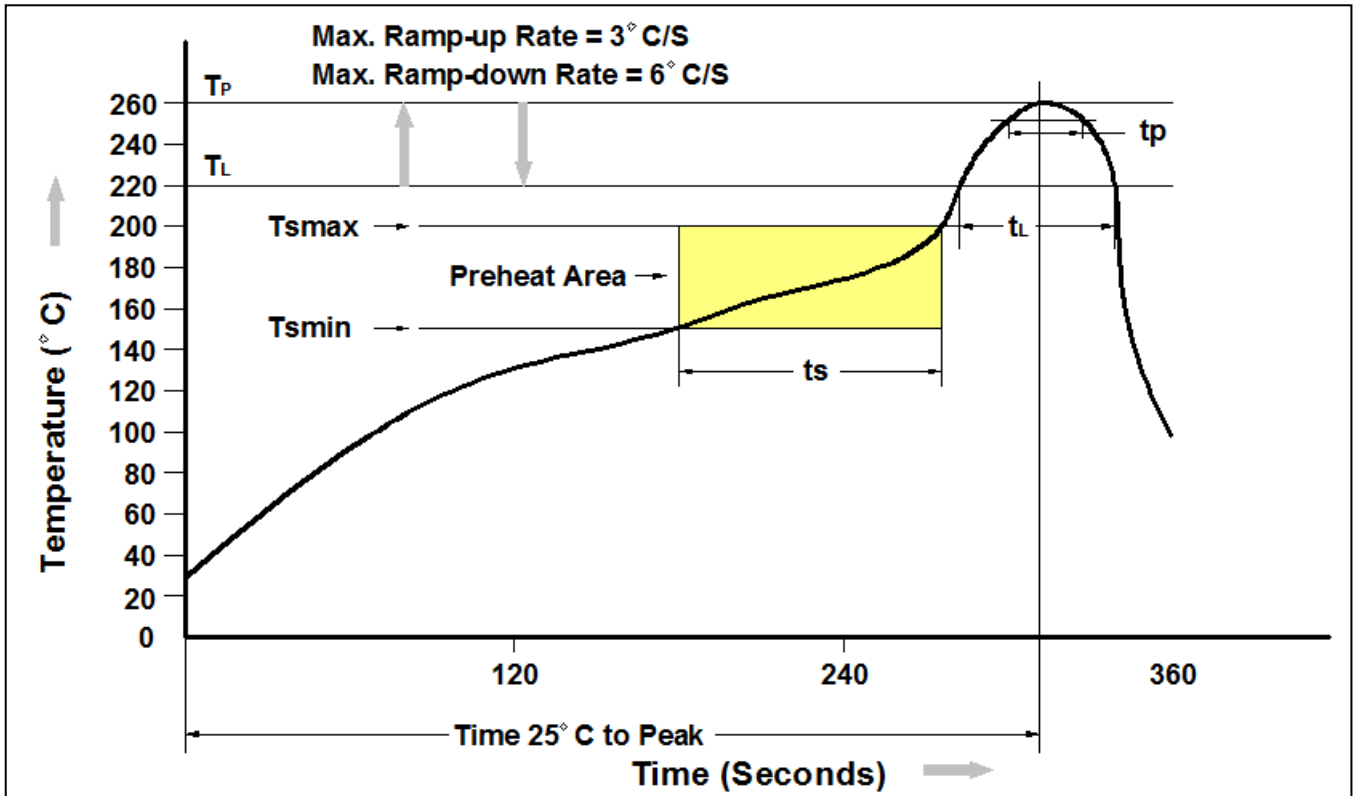
Time: 5 sec max.



# CTH291-4 Series

## DC Input 16-Pin DMC<sup>®</sup> Half Pitch Mini-Flat Phototransistor Optocoupler

### Reflow Profile (follow the JEDEC standard J-STD-020)



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmmin)	150°C
Temperature Max. (Tsmmax)	200°C
Time (ts) from (Tsmmin to Tsmmax)	60-120 seconds
Ramp-up Rate (tL to tp)	3°C/second max.
Liquidous Temperature (TL)	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time (tp) within 5°C of 260°C	30 seconds
Ramp-down Rate (TP to TL)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.



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